

# ABSTRACT

## Data transmission in pipeline systems

A first set of apparatus is arranged for transmitting data from a point in a cased section of a well 1, 3 to a remote location. The apparatus may be used as a relay station 6 to increase operational depth. Signals are applied to and received from the string 1 at the relay station 6 and a selected length of the string 1 is provided with insulating spacer means 9 on either side of the relay station to ensure that the string 1 and casing 3 are effectively isolated for a selected minimum distance. This enables potential differences to be both applied to and detected from the string 1, thus allowing data transmission and reception. A second set of apparatus is arranged for transmitting from an internal unit 408 inside a cased section of the well 401, 403 to the immediate surrounding area outside the casing 403. The internal unit 408 injects current into the string 401. A toroid 415 which surrounds the casing 403 is provided to pick up signals. Spaced connections between the string 401 and casing 403 are provided by conductive packers 411. A mismatch in the current flowing in the string 401 and casing 403 is generated so that a non-zero flux is seen by the toroid and hence a signal can be received.

Figure 2